GOSHEN FIRE DEPARTMENT'S SAFETY PROGRAM EVALUATION

STRATEGIC MANAGEMENT OF CHANGE

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ABSTRACT

Goshen Fire Department experienced 41 injuries between 1994 to 1998. Fire Chief Larry Gill tried to control the injuries by appointing a safety committee that would reduce injuries through a safety program. The safety program was instituted in two phases. The first phase of the safety program was implemented on January 12, 1998 and implementation date of the second phase was year 2000.

The safety committee was unable to determine whether the safety program was reducing the number of injuries that were occurring at Goshen Fire Department. The problem for this research was created because the safety program was not evaluated after its implementation.

The purpose of the research was to evaluate the Goshen Fire Department's safety program to identify whether safer operations occurred on the fire ground since the safety programs implementation. An evaluative methodology was utilized to answer four research questions.

1. Were there any legislative mandates requiring a safety program for Goshen Fire Department?

2. Has the Goshen Fire Department's safety program significantly reduced the number of injuries within the organization?

3. Was the entire safety program going to meet the implementation target date deadline of year 2000?

4. What did the fire suppression personnel of Goshen Fire Department think of their safety program?

The research procedure utilized a literature review to disclose federal regulations, national standards, safety committee reports, and published materials that enforced the legislative mandates

requiring a safety program. A survey was conducted on the Goshen Fire Department's fire suppression personnel to reveal their opinions about the safety program. Several suggestions for improvements to the safety program were obtained from the survey results.

Research results revealed four resources that identified mandates requiring a safety program, a 50% reduction in injuries; three suggestions for improvements requiring more training, men, and testing; and the second phase of the safety program was not 95% implemented by June, 1999.

Recommendations consisted of disclosing the city's financial commitment to the department's safety program, analyze the department's injury statistics bi-annually, develop a new second phase schedule for implementation, and institute the three suggestions obtained from the survey to maintain fire fighter commitment.

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INTRODUCTION

Goshen Fire Department's Fire Chief Larry Gill, organized a safety committee in January 12, 1995 to reduce the significant number of fire ground injuries that were occurring within the department (Goshen Fire Department, 1995a). The department experienced eight emergency response personnel injuries in 1994 resulting from fire ground activities. These eight injuries were a substantial increase from the number of injuries that occurred during the previous year of 1993 which was zero (Goshen Fire Department, 1999a).

The safety committee's purpose was to develop and implement a safety program that would comply with the National Fire Protection Association's (NFPA) Standard 1500, so on January 12, 1998 the Goshen Fire Department's safety committee implemented a safety program that was suppose to reduce injuries to personnel around the stations and while operating at emergency incidents. The implementation of this safety program created the problem to be resolved by this research. The problem is that the safety program has not been evaluated since it has been implemented.

The purpose of this research is to evaluate the Goshen Fire Department's safety program to identify whether safer operations at emergency incidents have occurred due to the implementation of the safety program. This research will utilize an evaluative research methodology to answer the four research questions listed below.

1. Are there any legislative mandates requiring a safety program for Goshen Fire Department ?

2. Has the Goshen Fire Department's safety program significantly reduced the number of

injuries within the organization?

3. Is the entire safety program on target to meet the implementation deadline of year 2000?

4. What do the fire suppression personnel of Goshen Fire Department think of their safety program?

BACKGROUND AND SIGNIFICANCE

The Goshen Fire Department is a small paid department located in North Central Indiana. The department employs a civilian Fire Chief, Fire Inspector, and 45 firefighters. Fire suppression personnel are deployed between three shifts with 15 individuals assigned to each shift. The shifts are responsible for manning three engine companies, one paramedic engine company, and three paramedic ambulances. The normal staffing for an engine company and an ambulance are two firefighters per apparatus, except for the one paramedic engine company that has three people assigned to it. These vehicles are staffed 24 hours around the clock to provide emergency services to 24,930 citizens (U.S. Bureau of Census, 1996).

The Goshen Fire Department had never experienced, so many injuries in the history of the department. Over the period from 1994 to 1998, the Goshen Fire Department acquired 41 injuries that resulted in $36,0481 in insurance claims. The workers compensation insurance premiums increased by 37% or $5,899 during this five year time frame (Salem Insurance, 1999) . The Goshen Fire Department could not sustain this cycle of escalating fire ground injuries which resulted in increased insurance premiums paid by the department, so Chief Gill was forced by the city administration to reduce the number of injuries that occurred on the fire ground each year (Goshen City Council, 1995).

He delegated this task to the newly formed department's safety committee.

When Fire Chief Larry Gill established the safety committee in January 1995, he wanted all the committee members to be Captains. Chief Gill thought this membership would be able to obtain input about safety related information from both response and administrative personnel (Goshen Fire Department, 1995b)

The Fire Chief established a goal for the Captains to develop a safety program that would significantly decrease the number of injuries and prevent further injuries from occurring within the first year after the plan was implemented. A strategy for a safety program was then developed utilizing short term objectives and long term objectives. These objectives were discovered in the National Fire Protection Association's (1995) Standard 1500. These objectives were divided into two phases for implementation. The first phase of implementation was inexpensive and quick to complete. The short term objectives included developing, writing, and implementing policies and procedures that were not in place at Goshen Fire Department. Phase one was fully implemented on January 12, 1998 (Goshen Fire Department, 1998a) .

The second phase would cost $125,808.60 to implement over a five-year time frame. This long term objective included the purchase and testing of equipment. The second phase was to be fully instituted by year 2000 (Goshen Fire Department, 1996).

The safety committee developed several measurements to identify whether the safety program was achieving the intended objectives the committee had developed. The safety program first required that a significant reduction in injuries occur. A significant reduction in the number of injuries equates to decreasing them by 50%. Next, the safety program's implementation phase must be 95%

complete by June 30, 1999 so the long term goals will be met by year 2000. The safety committee wanted a disclosure of three recommendations for improvement to the safety program from the department's personnel. Finally, reveal three additional legislative mandates requiring a safety program that were not presented to the safety committee earlier (R. Kehr, J. Ramer, D. Showalter, K. Castetter, S. Hochstetler, personal communication, June 9, 1999).

This safety program evaluation must be performed to identify that a reduction in fire ground injuries have occurred, so the safety committee can provide changes to the safety program if it is required. The evaluation of the safety program can significantly impact the direction in which safety is portrayed within the Goshen Fire Department. Several benefits could result from the reduction in fire ground injuries, decreasing insurance premiums, and higher morale for fire fighting personnel. Some of the benefits resulting from a decrease in the number of fire ground injuries include more money to spend on equipment and supplies, less overtime money spent on fill-ins for injured fire fighters, personnel feel safer and more secure in their working environment, and the city administrators will view this problem correction very respectably.

The research material revealed by this program evaluation is relevant to the information received from the Strategic Management of Change course. The discussion over Module 3: "Managing Change Using The Change Management Model," presented ideas about tailoring the change model to each organization's requirements. This module stressed communicating the department's vision, values, and cultures with all personnel, staff, citizens, and agencies in the city to enhance the public perception and image of the department. Communications will provide a clear and consistent message about the strategic direction Goshen Fire Department will follow towards safety (United States Fire

Administration, 1996). This program evaluation will apply the lesson learned from a discussion which occurred in Module 3 by utilizing a survey to exhibit the department's personnel opinions about the safety program.

LITERATURE REVIEW

The literature review disclosed information that can be used as a foundation for the Goshen Fire Department's safety program evaluation. This research uncovered federal regulations, national standards, departmental policies and procedures, and publications that provide insight on the safety programs throughout the country.

Occupational Safety and Health Administration

The federal regulation requiring a safety program discovered in the literature review was 29 C.F.R 1910. This federal regulation was also exhibited in Indiana's Occupational Safety and Health Administration's (1998) *Occupational Safety and Health Standards for General Industry* which revealed that an employer must provide an employee with a work place free from recognizable hazards that could cause death or serious injury. Since Indiana is an OSHA state, the Goshen Fire Department is required to adhere to these federal and state regulations according to the Indiana Code. The Indiana Code mandates this compliance by every employer.

> Every employer shall comply with the Occupational standards and safety standards promulgated under this chapter, and pursuant to any directions in such standards, keep his employees informed of their protections and obligations under this chapter, the hazards of the work place and suitable precautions, relevant symptoms and emergency treatment for such hazards (Indiana Code, 1996).

This OSHA regulation was amended in 1998 to contain two regulations that require two safety programs to be evaluated annually. The two laws revealed in the OSHA regulation are 29 C.F.R. 1910.146 Permit Required Confined Space and 29 C.F.R. 1910.1030 Blood Borne Pathogens. These programs are to be evaluated annually because of the changes in legislation that may affect the specific programs (Occupational Safety and Health Administration, 1998). This research finding provides legal guidance about the required safety program contents, so development of a safety program can comply to the mandated legislative actions of the federal and state governments. These federal regulations can be utilized to answer research question number 1.

National Fire Protection Association

The National Fire Protection Association's (1997) Standard 1500 demands that every fire department must develop and adapt a written risk management plan. The plan must be evaluated every three years. The National Fire Protection Association (NFPA) has created standards that are not laws, yet they are used in court cases similar to laws.

John Rukavina (1993) in his article for Fire Chief magazine describes how the National Fire Codes are presented as the appropriate standard of care. The appropriate standard of care issue is exhibited as evidence for a negligence claim in a court of law. This interpretation of how the National Fire Protection Association standards are viewed by legal professionals provides a significant research finding to support the importance of a safety program. The credibility of a good safety program depends on how well an evaluation of the program is conducted. Without this legal interpretation, this research could have over looked some major legalities concerning safety programs. The Goshen Fire Department could have committed a negligent act without knowing. Research question number 1 is

provided with more information on the legal aspects of a safety program.

United States Fire Administration

This research utilized two publications from the United States Fire Administration. The first source derived from the *Strategic Management Of Change* course manual. This resource described the importance of departmental communications. The visions, values, and cultures of an organization must be communicated to the staff, personnel, citizens, and agencies that associate with the fire department (United States Fire Administration, 1996). This communication will establish the department's image and delivers a clear or consistent message about the strategic direction where the Goshen Fire Department is headed. This effort was reflected in this research by interviewing the opinions of the safety committee and surveying the fire fighters.

The manual utilized in the Strategic Management Of Change course was consulted for the number of individuals that must be surveyed for a 95% confidence level. For 45 fire fighters, 40 of the fire fighters were surveyed, and 5 of the fire fighters were randomly selected to complete the survey in order to test the instrument prior to administering it to the 40 fire fighters (United States Fire Administration, 1996).

The second resource that provided information for this research was the *Executive Fire Officer Program's Operational Policies and Procedures Applied Research Guidelines*. "The Future Readers"(United States Fire Administration, 1998, p. II-8) were addressed in the Recommendations section of this research. This information was utilized because the Applied Research Guidelines required that individuals reading this research be provided with a recommendation for future use. This material contributed a sense of forecasting for this research so present problems might be

corrected in the future.

Goshen Fire Department Operational Guidelines

The Operational Guidelines for Goshen Fire Department cover a number of procedures that were never placed on paper prior to the safety programs implementation. These newly adapted policies cover running procedures, accountability systems, infectious control procedures, driving safety, training policies, and numerous other topics that provide a safe work environment for fire service personnel. The date of January 12, 1998, was revealed by these policies and procedures as a time reference for this research.

The five years of notes and minutes accumulated by the safety committee were utilized for the information about monetary totals for implementing the safety program, as well as dates for implementation of the safety program. These departmental documents provided the research with factual content about the topics covered, their costs to implement, and dates that implementation were to occur.

Departmental injury statistics over the past five years were utilized to verify whether the safety program has reduced injuries from the time of implementation to July, 1999. These statistics provided costs of injuries, as well as type of injuries that were received by the fire fighters. The type of injury will not be utilized in this research. However, the number of injuries and costs of injuries provided a significant impact on this research.

The documents from the Goshen Fire Department were utilized extensively in the evaluation. This material will be utilized as the core of this evaluation to identify the successfulness of the safety program. Research question numbers 2 and 3 are supported by these departmental documents.

Insurance Statistics

Goshen workman's compensation insurance company , Salem Insurance Company (1999), was consulted for a print out of the number of injuries and their costs over the past five years. The costs of insurance premiums and the percentage of increase of the insurance premiums were obtained as well. This information established the effect that result from numerous injuries which occurred frequently and the significance of reducing those injuries. These numbers played an important role in supporting research question number 2.

Survey Construction

Dr. Bob England from Oklahoma State University was consulted by E-mail to review the survey that was developed. He was asked to scrutinize this survey instrument to provide this research with a valid source of knowledge on survey construction. He returned his E-mail with his approval of the survey questions (B. England, personal communication, May, 1999). The survey is a vital link to answering research question number 4.

Safety Committee

Captains Ross Kehr, Don Showalter, Jim Ramer, Steve Hochstetler, and Kit Castetter (personal communication, June 9, 1999) were interviewed because they are the current members of the safety committee. They were asked to formulate criteria and goals that the program evaluation should use as guidance during the research. They confirmed the use of the four research questions and developed the criteria that established the success of the safety program.

PROCEDURES

This research started during the week of March 1, 1999 while the author was at the National

Fire Academy's Executive Fire Officer Program. During the Strategic Management of Change course, Dr. Calvin S. Posner provided guidance on how to develop topics, problem statements, purpose statements, and research questions for the course's research paper. The author developed the required information for Dr. Posner to approve. After approval was received for the topic, problem statement, purpose statement, and four research questions, a literature review was conducted at the National Fire Academy's Learning Resource Center. **Literature Review at the National Fire Academy**

This literature review disclosed the information found in the National Fire Codes published by the National Fire Protection Association. Only one article of relevance was found during the search at the Learning Resource Center. This article was, National Standards and Negligence, written by John Rukavina.

Departmental Research

During the week of March 8, 1999, information from policies, procedures, minutes, and notes were gathered from the safety committee meetings and memos. This information consisted of the number of injuries, type of injuries, and cost of injuries that occurred over the past five years within the Goshen Fire Department. Dates of policies, procedures, reports, and recommendations to the Fire Chief were utilized in the research process as well (Goshen Fire Department, 1995a, 1995b, 1996, 1998a, 1998b, 1998c, 1999a, 1999b, 1999d, 1999e).

The week of March 15, 1999 recommendations and their costs were itemized and listed along with the projected dates that they were to be instituted. The injuries were entered into the computer program SSPS 8.0 Student Version software package. This computer software package is a statistical program for college students to use in learning statistics on a personal computer.

Research was conducted in the OSHA 29 C.F.R. 1910 regulation during the week of March 22, 1999. This research disclosed that the Permit Required Confined Space and Blood Borne Pathogen programs were required to have annual evaluations. A third OSHA requirement was found that required Goshen Fire Department's safety committee to provide all employees with a safe work place. The department as an employer must provide it's employees with a work place free from recognizable hazards that could cause death or injury (Occupational Health and Safety Administration, 1998).

Insurance Research

Salem Insurance Company was requested to disclose the workers compensation costs and premium rates for the past five years on March 29, 1999 by a letter. On April 5, 1999, the requested information was received from Salem Insurance Company. This information had to be complied and tabulated because they provided numbers that were not calculated. The letter explained the procedure for calculating percentages.

Survey

May 3, 1999 Dr. Bob England from Oklahoma State University was contacted by E-mail to review the survey that was developed for this research. Dr. England provided validity to the survey and expert knowledge on survey construction. May 7, 1999; Dr. England responded back to the author with his approval of the survey. Dr. England gave several suggestions to enhance the survey's effectiveness. These changes were implemented and tested.

A test sample of 5 randomly selected fire fighters was conducted on May 24, 1999. These 5 individual's names were drawn from a hat from among the 45 fire suppression names on the Goshen

Fire Department. The 5 individuals were given the survey and instructions on how to complete it. They completed the survey, and changes were made from the suggestions that were supplied to the author. This random test assured the survey of valid and reliable results.

The survey was then administered to 40 fire suppression members of the Goshen Fire Department. All 40 members completed the survey during the week of June 7, 1999. These 40 individuals provided a 95% confidence level (United States Fire Administration, 1996).

During the week of June 14, 1999, the statistical data from the survey was entered into the computer utilizing the software program SPSS Student Version 8.0 for Windows. The survey results were interpreted, analyzed, and entered into tables for completion of the research.

Oklahoma State University Research

While the author was at Oklahoma State University (OSU) for the two weeks of May 10-21,1999, a literature review was conducted in the OSU library. This search revealed no information or materials to enhance this research further.

Stakeholders

During June 9, 1999, the Safety committee was interviewed. This interview enabled the safety committee to establish the criteria and goals that the program evaluation should utilize as guidance during the research. The criteria disclosed by the safety committee resulted in a 50% reduction in injuries; 95% completion of the implementation phase by June 30, 1999; disclosure of three recommendations for improvement to the safety program from departmental personnel; and reveal three legislative mandates requiring a safety program that the safety committee did not acknowledge during their research.

The safety committee approved of the four research questions that were suggested by the author, and confirmed by Dr. Posner as goals for this research. The safety committee did modify the research questions slightly. They did not change the content of the questions. They only changed the wording of these questions.

Reporting the Results

The research results were combined, so a draft report could be developed over the weeks of July 1-30, 1999. A draft copy of the results was completed on July 31, 1999. This draft report was edited and corrected during the week of August 1, 1999. The final report was completed on August 10, 1999.

Limitations

The limitations for this research resulted in the literature review process only finding information in the federal regulations, National Fire Protection Association's Standard 1500, and one published article. The other information was found in the department's records and within the workman's compensation statistics. Goshen Fire Department does not have a record of evaluating programs that have been instituted, so the department is very relaxed about keeping statistics.

The record keeping within the Goshen Fire Department does not provide for a accurate count on injury statistics. These injury statistics were gathered from run reports, safety committee meeting minutes, and memos presented to the Fire Chief or safety committee.

The safety program was a new program that was instituted approximately one year ago so there were no times, or statistics available to sufficiently evaluate the safety program. The safety committee had never had to evaluate a program before, so they had no idea what criteria should be

required of the safety program in order to evaluate the progress of the program. This made the evaluation process difficult to provide the correct material to prove that the safety program was successful and effective.

Definition of Terms

Accountability Systems: A system for accounting for all personnel and their location on the fire ground.

Blood Borne Pathogens: Infectious material that could expose fire fighters to serious illnesses.

Confidence Level: A term that refers to a representation sample of a population. A higher confidence level provides a higher accuracy of results presented.

Criteria: Guidelines established by the safety committee to verify the effectiveness or performance of the safety program.

Data Cluster: Numbers that are close together.

Emergency Incidents: Locations where fire fighters and Emergency Medical Technicians are called to provide fire suppression, medical, rescue, or other types of assistance to the citizens of Goshen.

Emergency Response Personnel: Fire Fighters and Emergency Medical Technicians that respond to emergency calls for help.

Engine Company: The fire engine, equipment on the fire engine, and the two fire fighters assigned to that fire engine.

Executive Fire Officer Program: A four year program established for the nations fire service executives to acquire knowledge in administrative issues.

Fire Suppression Personnel: Fire fighters responsible for extinguishing fires when they are called upon to do so. The Fire Chief and Inspector are not considered fire suppression personnel in the city of

Goshen.

Fire Ground: The area located in or around the fire building.

Goals: The four research questions established for this study.

Infectious Control Procedures: Guidelines and procedures developed to protect Emergency Medical Technicians from obtaining serious illnesses.

Mean Average: The process of summing a group of numbers divided by the number of numbers.

National Fire Academy: An institution established by the federal government designed to train the nations fire service in administrative and technical issues.

National Fire Codes: Fire standards and codes published by the National Fire Protection Association.

National Fire Protection Association (NFPA): An organization which sets fire protection standards within the United States of America.

National Fire Code Standard 1500: A set of guidelines established by the NFPA for fire departments to follow when developing a safety program.

Occupational Health and Safety Administration(OSHA): A federal agency responsible for promulgating rules and enforcing them for employee safety issues. This agency can issue fines to municipalities and industry.

Paramedic Engine Company: Paramedics, advanced life support equipment, fire engine, fire equipment, and three fire fighters assigned to that fire engine. A paramedic must be assigned to this fire engine at all times.

Permit Required Confined Space: A confined area that has several restrictions applied to the entry procedures because of the possible danger to the individual when inside the space.

Reliable: A measurement of consistency. The same result is received each time the survey is conducted.

Safety Committee: The group of individuals assigned by Fire Chief Gill to reduce the number of injuries occurring in the Goshen Fire Department. The committee consisted of five captains from all three shifts.

Safety Program: The program that was designed by the safety committee to reduce injuries of Goshen Fire Department personnel. This program consisted of instituting policies, procedures, rules, training, and purchasing safety equipment to provide a safe work environment for fire fighters.

Standard Deviation: The square root of the average squared from the mean.

Valid: A survey that measures what it was designed to measure.

RESULTS

Research Question Number 1

Are there any legislative mandates requiring a safety program for Goshen Fire Department?

Federal Regulations

The research for this question disclosed several new sources of information that revealed why a safety program was required for the Goshen Fire Department. The federal government, through OSHA, requires that the employer provide the employee with a work place free from recognizable hazards that could cause death or serious injury. This federal regulation enforces the need for a safety program to be established by the employer. The Blood Borne Pathogen and Permit Required Confined Space regulations require the employer to evaluate these programs annually. Since the Goshen Fire Department has both of these two programs implemented in their safety program, the safety committee must evaluate them (Goshen Fire Department, 1998b, 1998c). Mandates are vital to disclose to the

Safety Committee, so they can implement any safety programs that are required for protecting emergency response personnel from injuries.

National Standards

The National Fire Protection Association (NFPA) provides a standard for fire department safety programs. This standard contains many different topics that are suggested as contents within a safety program. The NFPA Standard 1500 outlines the procedures and policies that need to be instituted in the department for the safety program to work. These procedures include a risk management plan to be instituted, but the plan must be evaluated every three years (National Fire Protection Association, 1997).

John Rukavina's article explains how these NFPA standards are utilized in court as national standards of care. The departments that do not comply to these standards are negligent of providing the employee with a safe work environment.

The three federal regulations mandated by OSHA and the one NFPA requirement provide significant evidence that a safety program is required by law. The article by John Rukavina enforces the evidence by exhibiting information on how the courts utilize national standards in litigation proceedings. These four resources answer research question number 1, and provide ample proof for the Goshen Fire Department's safety committee to justify the requirement for a safety program.

Research Question Number 2

Has the Goshen Fire Department's safety program significantly reduced the number of injuries within the organization?

Fire Ground injuries for the Goshen Fire Department ranged from zero to 16 during the years of

1993 to 1998 (Salem Insurance Company, 1999) . This data was collected from a 50-member fire department over a five year time frame. The measure of success for research question number 2 determines if a significant reduction of injuries occurred after the safety program's first year of implementation. Significant is defined as a 50% decrease in injuries as defined by the safety committee.

Injuries and Insurance Claim Costs

Goshen Fire Department had no injuries or insurance claim costs in 1993 but in 1994 eight injuries occurred with a total insurance claim cost of $4,458.94 (Salem Insurance Company, 1999). The mean average cost of insurance claims was $557.37. The standard deviation for the insurance claims disclosed was $623.69 (see Table 1). The standard deviation reflects how closely the data cluster was around the mean average. This fairly large standard deviation is contributed to only eight entries for the calculation, and the data cluster was distantly removed from the mean average. This data cluster is explained with a range from $70.80 to $1,843.43.

For 1995 five injuries occurred at the Goshen Fire Department with a sum of insurance claim cost of $2,713.76 (Salem Insurance Company, 1999). The mean average insurance claim cost was $542.75. This mean average insurance claim cost had a standard deviation of $773.46. This high standard deviation is contributed to only five entries, as well as the range from $30.60 to $1,890.36 (see Table 1). The data cluster for the standard deviation is separated significantly from the average mean.

The year of 1996, revealed an increase of sixteen injuries, and a sum of insurance claim costs of $3,863.37 (Salem Insurance Company, 1999). The average mean of insurance claim costs amounted to $241.46 with a standard deviation of $221.98. The significantly high standard deviation was

calculated on twelve more entries than the rest of the categories, but the range of $40.50 to$761.00 contributes to the large separation of a data cluster around the mean average (see Table 1).

Even though the injuries which occurred in 1997 totaled eight, the total sum of the insurance claim costs increased to $23,316.65 (Salem Insurance Company, 1999). The mean average cost of insurance claims calculated to $2,902.08. A standard deviation increased the mean average to $7,194.44. This is an unusual occurrence, but the range of the entries may explain this phenomena. The range that existed for 1997 was $91.20 to $20,730.00 (see Table 1). The one entry was created by a significant injury which occurred during training. A probationary fire fighter was participating in a department physical fitness test. While extending three 50 feet sections of two and one half inch hose lines he fell to the ground at the halfway point with both of his knees dislocated. This fire fighter was off duty for more than one year rehabilitating his injuries (Goshen Fire Department, 1997a).

After the Safety Committee implemented the safety program in 1998, a total of four injuries occurred. The total cost of insurance claims decreased to $2,353.12 (Salem Insurance Company, 1999). The average mean of the insurance claim costs was identified as $588.30. The standard deviation of $322.74 was obtained from a range of $253.75 to $1,016.78 (see Table 1). The large standard deviation calculation can be accounted for by only having four entries and the separation of the data cluster around the mean average.

The safety program has decreased the number of injuries which occurred in 1994 by 50%. However, the extended length of implementation of these policies and procedures created a trend that was occurring from the newly hired firefighters. This trend occurred by opening a new station in which nine new people were hired, and several retirement positions were filled. This created a significant

Table 1

Goshen Fire Department's Injury and Insurance Claim Costs

YEARS	NUMBER OF INJURIES	SUM OF INSURANCE COSTS	MEAN AVERAGE OF INSURANCE COSTS	STANDARD DEVIATION OF INSURANCE COSTS
1993	0	0	0	0
1994	8	$4,458.94	$557.37	$623.69
1995	5	$2,713.76	$542.75	$773.46
1996	16	$3,863.37	$241.46	$221.98
1997	8	$23,216.65	$2,902.08	$7,194.44
1998	4	$2,352.12	$588.03	$322.74

training and safety problem because 25% of the department had less than one year of experience in fire fighting (Goshen Fire Department, 1997b).

The answer to research question number 2 is, yes, the reduction of injuries has occurred by 50%. However, during the planning and implementation phase, of more than three years, a trend had occurred in which the safety committee had no control over. The trend is now proceeding toward a decrease in injuries for the Goshen Fire Department. The data received from these injuries and insurance claim costs should provide proof that a reduction in injuries have occurred since the safety program's implementation in 1998.

Research Question Number 3

Is the entire safety program on target to meet the implementation deadline of year 2000?

The measure of success for research question number 3 is to identify the number of completed safety improvements implemented and the total expenditures of the remaining issues to be instituted. This list will reveal if an 95% completion rate has occurred for implementation of safety issues. Expenditures for equipment purchases and equipment testing must reach the 95% mark because the year 2000 is less than six months away.

Safety Issues and Costs of Implementation

Reviewing the Goshen Fire Department's safety program minutes identified seven issues or 43.75% of the issues had been implemented by June 1999. However, 10 issues or 56.25% were left to be implemented after June, 1999. The remaining cost of implementation is $117,808.60 or 93.66% of the calculated expenditure. The money spent on safety so far was $28,000 with $8,000 or 6.34% of the costs implemented (see Table 2). A total of $20,000 was spent for an air compressor that was not

listed on the safety program appropriation list. If 95% of the activities were implemented, Goshen Fire Department would have reduced the safety program expenditures by $119,518.17. The cost of $8,000 for items already instituted was insignificant when compared to the cost of items left to implement, $117,808.60 (Goshen Fire Department, 1999b).

Research question number 3 will not meet the implementation deadline of year 2000 because nine or 56.25% of the items were not implemented or purchased at a cost of $117,808.60 for 93.66% of the appropriated safety program expenditure.

Research Question Number 4

What do the fire suppression personnel of Goshen Fire Department think of their safety program?

Goshen Fire department's Safety Survey Results

The Goshen Fire Department's safety survey consisted of 20 questions that asked 40 of the 45 Goshen fire fighters about their knowledge of safety requirements, and their opinions of several safety issues as well. The 40 fire fighters that completed this survey accounted for 100%of the fire fighters that were surveyed the first initial time. This high percentage was achieved by the author personally handing the survey to each fire fighter and waiting for the survey to be completed (see Appendix A). The results of this survey have been tabulated and are exhibited in a table (see Appendix B).

Survey question numbers 1, 2, 3, 4, and 5 revealed that the highest percentage of fire fighters, 97.5%, responded to survey question number 5 about their familiarity with the Goshen Fire Department's Operational Guidelines while the lowest percentage of fire fighters, 10%, responded yes to survey question number 1 about their familiarity with the OSHA regulation 29 C.F.R. 1910. These

Table 2

Goshen Fire Department's Table of Implemented and Non Implemented Issues

IMPLEMENTED SAFETY ISSUES	NON IMPLEMENTED SAFETY ISSUES
Air quality testing for self contained breathing apparatus - Comply	Noise reduction - $10,000
Emergency Medical Service clothing - comply	Station uniforms according to national fire protection association
Incident command policy - comply	Personal alert safety system testing documentation
Medical evaluation of personnel - in the process	Rope testing
Physical fitness testing - comply	Apparatus exhaust fume system for each station - $ 45,000
Critical stress debriefing - comply	Ladder testing
Self contained breathing mask for each individual - comply	Self contained breathing apparatus testing
43.75 % Compliance	Self contained breathing apparatus mask testing and fit testing
6.34% Appropriation used $8,000	Training for firefighters and officers
	56.25% Non compliance
	93.66% Appropriation not implemented $117,808.60

Note. [a]Implementation of 95% of the activities would result in 15.5 issues completed.

[b]Implementation of 95% of the appropriation would result in $119,518.17 spent.

survey questions established a pattern that was exhibited by the fire fighters who responded to the questions. If the safety regulations are used by the fire fighters on a daily basis, the fire fighters are more familiar with it.

Survey question number 6 identified that only 25% of the 40 fire fighters completing the survey knew the OSHA regulation was applicable to the Goshen Fire Department. This knowledge of the OSHA compliance was not understood by 70% of the survey participants.

Survey questions 7, 8, and 9 revealed a level of confidence to the safety committee. Question 7 listed 60% of the survey responses that thought the Goshen Fire Department was creating a safe work environment while question number 8 exhibited 85% of the respondents who thought the safety committee was providing steps to significantly reduce injuries to the members of the organization. Question number 9 presented 82.5% of the opinions from 40 fire fighters that thought the operational guidelines have reduced injuries at the Goshen Fire Department.

Survey question numbers 10, 11, and 12 exhibited the fire fighters feelings of security towards the department, safety committee, and operational guidelines. Question number 12 established 69.2% of the fire fighters believed the operational guidelines had protected them from injury while question number 10 provided evidence to show that 67.5% of the respondents thought the department had protected them from injury. Question 11 identified that 63.2% of fire fighters completing the survey felt the safety committee was protecting them from injury.

Survey question 13 and 14 received very low scores for the departmental compliance with NFPA and OSHA regulations. From the 40 fire fighters, only 12.5% of them thought Goshen Fire Department complied with the NFPA Standard 1500. Only, 7.7% of the fire fighters thought Goshen

Fire Department was in compliance with the OSHA regulation.

Training as a means of reducing injuries was exhibited in question number 15. Only, 42.5% of the fire fighters believed training was sufficient to reduce injuries to the members of the Goshen Fire Department, yet 50% of the respondents have memorized the Goshen Fire Department's Operational Guidelines. These figures reflect the desire and need for additional safety training and training over the operational guidelines of the department.

Survey question 17 provided the years of service of those fire fighters completing the survey. Just under half or 42.5%, of the fire fighters had less than 5 years of service. The second highest category was 6-10 years of service completed by 20% of the respondents. These figures identified that 62.5%of the fire fighters answering the survey had less than 11 years employment on the Goshen Fire Department. In comparison, the Goshen Fire Department has 65% of its fire fighters with less than 11 years of service on the department (Goshen Fire Department, 1999c).

From the survey respondents, 52.5% have contributed safety suggestions to the safety committee. This figure of 52.5% accounts for the 21 fire fighters who submitted suggestions for improvements to the safety committee. These suggestions are located in the safety committee's minutes that were researched by the author (Goshen Fire Department, 1999d).

In survey question 19, training was identified by 29.6% of the fire fighters as the improvement that they would most like to see in the safety program. While 25.9% of the fire fighters would like to see more men for staffing, as a safety improvement to the department. The safety improvement that was noticed by 25% of the fire fighters answering survey question number 20 was the two-in and two-out policy. This policy requires that two fire fighters remain outside the fire building as back-up while

two fire fighters enter the fire building to extinguish the fire (Occupational Safety and Health Administration, 1998).

Research question number 4 is answered with the Goshen Fire Department's survey results. The survey provides the safety committee with three recommendations for improvement to the safety program which is one of the four criteria that was established by the safety committee. The survey also renders opinions of fire fighters to the safety committee. These opinions are above the 85% range towards the safety committee. The safety committee received the lowest percentage of responses in question 11. The safety committee is unable to prevent previous injuries to fire fighters. This question should be evaluated further in another year since the safety program is only one year old. The fire fighters impressions of the safety program and safety committee are very high according to the survey responses.

Final Conclusions

The conclusion of this research is clarified by the findings that was mentioned in the responses to all four research questions. The information that was revealed in research question number 1 disclosed four laws that had not been presented to the safety committee earlier in the safety program's history. Could this information make a difference as to the outcome of the safety program? This information is unknown because the safety committee followed the NFPA Standard 1500 which provides the contents of a safety program that will establish the work place free from hazards that could cause serious injury or death.

The results of the information obtained to answer research question number 2 established that a 50% reduction in injuries from 1994, this is why the safety committee was formed, but the fire fighter

injuries which occurred during the next three years escalated to 16 injuries during 1996. The number of injuries that was recorded in 1998 supported a 75% decrease in injuries from 1996 to a 50% reduction in 1994.

Research question number 3 reveals the results of the second phase of the safety program evaluation. The second phase of the safety program will not be instituted by the year 2000 because only 6.34 % of the appropriations have been utilized. This means that only 43.75% of the issues are in compliance with the safety program. For 95% of the safety program to have been instituted, 15.2 issues should have been completed and $119,518.17 should have been spent on the purchase of required safety equipment.

In research question number 4 the recommendation of three improvements to the safety program was identified from the survey, and 40 fire fighter's revealed their opinions that more training, manpower, and skill testing be implemented into the Goshen Fire Department's safety program. This information will be very helpful to the safety committee in future program development.

The information that was gathered in this research suggests that the safety program is providing a reduction in injuries and developing a much safer work environment for the fire fighters of Goshen Fire Department. Once the second phase of the safety program has been implemented, the safety program will be significantly enhanced to provide a safer work environment that will minimize the number of injuries which occur on the fire ground and around the fire station.

DISCUSSION

The information found in the literature review process on evaluations of safety programs was very limited. There were only two safety program evaluations contained in the National Fire Academy's

Learning Resource Center. These two evaluations have been outdated for sometime, and they did not use a complete evaluation technique. There were no publications found on the evaluation process in the fire service for safety programs. A true comparison of the findings revealed in this evaluation process, and the findings disclosed by others in the fire service were unable to be presented.

Author's Interpretation

The results revealed from the information that was disclosed in the evaluation process of the Goshen Fire Department's safety program will be very informative to the safety committee. This material identified several positive outcomes through the survey process. Many of the fire fighters have a high regard for the safety committee, and the operational guidelines that the safety committee implemented into the department. This support provides the safety committee with a positive approach towards the work that they must continue to diminish injuries from the work place.

The safety committee will have to generate support from the department's management to speed the process of implementing the second phase of the safety program. This second phase will enhance the compliance of the NFPA Standard 1500, and enable the safety program to function at a more efficient level of injury prevention for the members of the organization.

The article published by John Rukavina will hopefully stimulate the city's administration enough to release the required financial appropriations to fund the safety program properly. If not, the safety committee will be able to utilize the information gained from the article as leverage to acquire more support from the legal department. The legal department might provide some insight to the city's administration about the their exposure to the repercussions of non-compliance.

The overall success of the safety program is remarkable considering the minimum commitment

of resources offered by the city's administration. The three years of work by the safety committee required minimal expenditures to supply an effective injury reduction program. The effort put forward in the operational guidelines resulted in a major pay-off for the Goshen Fire Department.

Implications for Goshen Fire Department

Goshen Fire Department will benefit from this safety program evaluation because the safety committee now has a direction to continue with. The safety committee's pursuit of the implementation of the second phase is their first priority. Until now, the safety committee was unaware of the pathway to traverse because the effectiveness of the program was unknown and the implementation status of the second phase was unclear. With this evaluation, a new schedule for the second phase of implementation can be developed by the safety committee. The cost of purchasing equipment to fulfill the safety program's obligations will be readjusted to the implementation schedule. After the development of a new implementation deadline by the safety committee, the urgency of need for the safety program to be fully instituted as soon as possible will be established.

The reduction of injuries are still the focus of the Goshen Fire Department's Safety Program. However, the decrease in workman's compensation insurance rates provide a significant advantage to the citizens of Goshen by minimizing tax increases to compensate for the increased workman's compensation insurance rates.

RECOMMENDATIONS

The results of this research have disclosed information that was gathered for the Goshen Fire Department's Safety Committee to utilize and enhance the safety program. Several recommendations will provide guidance for the safety committee to pursue in order to accomplish the goals and criteria of

this research.

Recommendation Number 1

First, the information obtained from the results of research question number 1 must be exhibited to the city's administration to explain the importance of the city's financial commitment in providing a hazard free environment for the fire fighters. This financial commitment is mandatory according to the federal OSHA regulations. There were four sources revealed in the literature review that exhibited these legalities the city has in supplying a hazard free work place for the fire fighters.

Recommendation Number 2

Second, statistical data of injuries must be kept and organized for analysis by the safety committee, so the committee can identify the types of injuries that are occurring, and the frequency of occurrence the injuries occur. This data must be utilized by the safety committee, so they can continue to institute corrective actions for the hazards that are causing injuries. These statistics will provide the next safety program evaluator with the proper data to identify the effectiveness and costs of the safety program. The data in this research was very difficult to obtain because the department did not keep appropriate record of injuries in a designated location.

Recommendation Number 3

Third, an implementation schedule, cost of implementation, and a deadline of implementation must be agreed upon by the safety committee, department administration, and city administrators, so an urgent but achievable time table can be accomplished for instituting the second phase of the safety program. Without this second phase of the safety program, the fire fighters of Goshen Fire Department are still exposed to the hazards of the work place. The second phase of the safety program provides

equipment testing and purchasing new equipment for the prevention of long term injuries and illnesses to the fire fighters (Goshen Fire Department, 1998e).

Recommendation Number 4

Finally, the Goshen Fire Department's Safety Survey provided the safety committee with three suggestions of improvements that fire fighters identified in their responses of the survey they completed. These suggestions must be analyzed, developed, and instituted for the fire fighters to maintain their high impressions of the safety committee and the corrective actions implemented by the safety committee. The high impressions were revealed in the questions answered by the fire fighters about their opinions of the safety committee. This support exhibited by the fire fighters must be harnessed by the safety committee, so the fire fighters will continue their involvement and contribute their suggestions for improvement of the safety program.

Future Recommendations

These recommendations will enhance the safety committee's abilities in preventing injuries and assuring the fire fighters a work place free from injury and death. This evaluation must also be utilized as an example of how fire service programs need to be evaluated by "Future Readers" in the fire service (United States Fire Administration, 1998). The recommendation for these future readers is to collect and store statistical data of injuries for their department so an analysis can be conducted on the data at least bi-annually. Quicker analysis of injuries provides patterns to be recognized which will allow corrections to be made in their safety programs sooner.

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Goshen Fire Department's Safety Survey

Please mark an answer yes, no, or other. Please feel free to mark other category if you do not know how to answer the questions, but please explain your answer. Please use the write in blanks for questions numbers 19 and 20 to explain your answers.

1. Are you familiar with 29 C.F.R. 1910 Occupational Safety Health Administration (OSHA) regulations for general industry?

Yes
No
Other

2. Are you familiar with the National Fire Protection Association's (NFPA) Standard 1500?

Yes
No
Other

3. Are you aware of the Goshen Fire Department's Safety Program?

Yes
No
Other

4. Are you familiar with the Goshen Fire Department's Safety Committee?

Yes
No
Other

5. Are you familiar with the Goshen Fire Department's Operational Guidelines?

Yes
No
Other

6. Did you know that 29 C.F.R. 1910 OSHA's regulations for general industry applies to the Goshen Fire Department?

Yes

No
Other

7. Do you feel the Goshen Fire Department creates a safe work environment for the organization's members?

Yes
No
Other

8. Do you feel the Goshen Fire Department's Safety Committee has provided steps to reduce injuries significantly to the members within the organization?

Yes
No
Other

9. Do you feel the Operational Guidelines have reduced the potential for injuries at the Goshen Fire Department?

Yes
No
Other

10. Do you feel the Goshen Fire Department has protected you from injury?

Yes
No
Other

11. Do you feel the Safety Committee has protected you from injury?

Yes
No
Other

12. Do you feel the Goshen Fire Department's Operational Guidelines have protected you from injury?

Yes
No

Other

13. Do you feel the Goshen Fire Department complies with the NFPA Standard 1500?

Yes
No
Other

14. Do you feel the Goshen Fire Department complies with 29 C.F.R. 1910 OSHA regulations for general industry?

Yes
No
Other

15. Do you feel the training at Goshen Fire Department is sufficient to reduce injuries to the members of the organization?

Yes
No
Other

16. Have you memorized the Goshen Fire Department's Operational Guidelines?

Yes
No
Other

17. How many years have been employed with the Goshen Fire Department?

0 - 5 Years
6 - 10 Years
11 - 15 Years
16 - 20 Years
21 - 25 Years
26 - 30 Years
31 - 35 Years

18. Have you contributed any safety suggestions to the Safety Committee?

Yes
No
Other

19. What improvements would you like to see in the safety program at Goshen Fire Department?

20. What safety improvements have you personally noticed at the Goshen Fire Department?

Table 3

Goshen Fire Department's Safety Survey Results

n = 40

Survey Questions	Percentage of Responses Yes	No	Other
Question 1: Are you familiar with the federal regulation 29 C.F.R.1910 Occupational Safety Health Administration's (OSHA) regulation for general industry ?	10.0%	87.5%	2.5%
Question 2: Are you familiar with the National Fire Protection Association's (NFPA) Standard 1500?	42.5%	37.5%	20.0%
Question 3: Are you aware of the Goshen Fire Department's safety program?	67.5%	22.5%	10.0%
Question 4: Are you familiar with the Goshen Fire Department's Safety Committee?	87.5%	10.0%	2.5%
Question 5: Are you familiar with the Goshen Fire Department's Operational Guidelines?	97.5%	0.0%	2.5%
Question 6: Did you know that 29 C.F.R. 1910 OSHA's regulation for general industry applied to the Goshen Fire Department?	25.0%	70.0%	2.5%
Question 7: Do you feel the Goshen Fire Department creates a safe work environment for the organization's members?	60.0%	12.5%	27.5%
Question 8: Do you feel the Goshen Fire Department's Safety Committee has provided steps to reduce injuries significantly to the members within the organization?	85.0%	5.0%	10.0%
Question 9: Do you feel the operational guidelines have reduced the potential for injuries at the Goshen Fire Department?	82.5%	15.0%	2.5%

Survey Questions	Percentage of Responses Yes	No	Other
Question 10: Do you feel the Goshen Fire Department has protected you from injury?	67.5%	17.5%	15.0%
Question 11: Do you feel the safety committee has protected you from injury?	63.2%	18.4%	18.4%
Question 12: Do you feel the Goshen Fire Department's Operational Guidelines have protected you from injury?	69.2%	20.5%	10.3%
Question 13: Do you feel the Goshen Fire Department complies with NFPA Standard 1500?	12.5%	43.5%	32.6%
Question 14: Do you feel the Goshen Fire Department complies with 29 C.F.R. 1910 OSHA Requirements for General Industry?	7.7%	17.9%	74.4%
Question 15: Do you feel the training at the Goshen Fire Department is sufficient to reduce injuries to the members of the organization?	42.5%	30.0%	27.5%
Question 16: Have you memorized the Goshen Fire Department's Operational Guidelines?	50.0%	30.0%	20.0%

Question 17: How many years have you been employed with the Goshen Fire Department?

Years of Service	Percentage of Respondents
0- 5	42.5%
6-10	20.0%
11-15	10.0%
16-20	10.0%
21-25	10.0%
26-30	5.0%
31-35	2.5%

Question 18: Have you contributed any safety suggestions to the safety committee?	52.5%	47.5%	0.0%

Question 19: What improvements would you like to see in the safety program at Goshen Fire Department?

Improvements	Percentage of Respondents
Training	29.6%
Procedures	11.1%
Testing	18.5%
Men	25.9%
Rehabilitation	7.4%
Accountability	3.7%
Consistency	3.7%

Question 20: What safety improvements have you personally noticed at the Goshen Fire Department?

Improvements	Percentage of Respondents
Training	21.9%
Procedures	15.6%
Testing	9.4%
Men	6.3%
Two in and two out	25.0%
Rehabilitation	3.1%
Safety Officer	12.5%
Accountability	6.3%